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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/982,048

10/18/2001

Brian L. Ganz

8497

7590

07/23/2004

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/982,048

Applicant(s)

GANZ ET AL.

Examiner

Mehrdad Dastouri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 30-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 30-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on June 17, 2004 has been entered.

Response to Amendment

2. Applicants' amendment filed April 29, 2004, has been entered and made of record.

3. Applicants' arguments have been fully considered but they are moot in view of new grounds of rejection. Although having two options ("0" and "1") meet the claimed limitation of "a plurality of options", for further emphasis, the Examiner cites the teachings of Carroll et al. explicitly indicating five options 0-4.

Claim Rejections - 35 USC ,§ 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 5, 6, 10, 13, 14, 17, 18, 22, 30, 31, 34, 35, and 39 are rejected under 35 U. S. C. 103(a) as being unpatentable over DeTitta et al.

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(hereinafter DeTitta), U.S. 6,368,402 in view of Carroll et al. (hereinafter Carroll), U.S. 2003/0194377.

As per Claim 1, DeTitta teaches:

A) at least one camera, (Column 10, Lines 41-42);

B) an indexing device ("custom built travel image stand", Column 10, Lines 38-41 and Daedal XY Precision with 4 axis indexing card, Column 10, Lines 47-50) for sequentially placing said microscopic crystals in camera view of said at least one camera (Column 10, Lines 42-43); and

C) at least one computer (Figure 9) programmed to control said indexing device and said at least one camera, wherein said at least one computer is programmed (Column 10, Lines 63-65) to receive from said at least one camera images (Column 11, Lines 7-9) of said plurality of microscopic crystals, wherein said at least one computer is programmed to classify (encoded zero or one, Column 11, Lines 14-23) said plurality of microscopic crystals by:

1. comparing said images to a database stored on said at least one computer (Figures 6 and 7; Column 7, Lines 20-26),
2. assigning a classification based on said comparison by:
 - a. making a determination as to whether a microscopic crystal exist (Figure 8; Column 7, Lines 4-14),
 - b. making a choice from the options as to what is present if said microscopic crystal does not exist (Figure 8; Column 7, Lines 4-14; A "0", Column 11, Line 14; Column 11, Lines 19-23), and

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c. making as to the qualities of said microscopic crystal if said microscopic crystal does exist (Column 7, Lines 10-14).

DeTitta does create a precipitation similarity score (precipitation reaction index) based on the results of 1536 precipitation reactions between an unknown protein and 1536 standardized cocktail solutions (Column 5, Lines 1133) providing capability of making a choice of "0" and "1" that meet the claimed limitation of "a plurality of options".

However, for further emphasis, the Examiner cites the teachings of Carroll et al. explicitly indicating five options 0-4 (Page 7, Paragraph 0051).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify DeTitta's invention according to the teachings of Carroll to make a choice from a plurality of options as to what is present if said microscopic crystal does not exist because it will illustrate the amount of precipitation at different stages (before and after aerosolization) thereby providing more versatile, accurate and reliable results.

As per Claim 2, DeTitta teaches: a computer monitor (Column 10, Line 67-Column 11, Line 3, Figure 9, element 36), wherein an operator interfacing with said at least one computer manually inputs a score (a "1" or "0", Column 14-17) to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

As per Claim 5, DeTitta teaches: wherein each of said plurality of microscopic crystals are contained within a drop of liquid (Column 9, Lines 52-

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57), wherein each drop of liquid is contained within a well of a micro-well plate (Column 10, Lines 2-3, see Figures 1-4 ;).

As per Claim 6, DeTitta teaches:

wherein said plurality of microscopic crystals are a plurality of protein crystals inside the wells of at least one micro-well plate (Column 11, Lines 8-10, see Figure 8).

As per Claim 10, DeTitta teaches:

a frame grabber for receiving images of said plurality of microscopic crystals from said at least one camera (Column 10, Lines 52-53).

As per Claim 13, DeTitta teaches:

A) sequentially placing said plurality of microscopic crystals in camera-view (Column 10, Lines 42-43) of at least one camera utilizing an indexing device (Daedal X-Y Precision with 4 axis indexing card, Column 10, Lines 47-50);

B) taking the images of said plurality of microscopic crystals with said at least one camera (video system records individual wells, Column 10, Lines 42-43 and feeds into a framegrabber, Column 10, Lines 51-53),

C) transferring said images to at least one computer (the images are recoded and saved to a file, Column 10, Lines 53-58),

D) receiving said images at said at least one computer (Column 10, Line 67-Column 11, Lines 3), and

E) classifying said images at said at least one computer (Column 11, Lines 8-17), wherein said at least one computer is programmed to control said at

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least one indexing device and said at least one camera (the table motion and image capturing; is computer controlled, Column 10, Lines 52-55).

As per Claim 14, DeTitta teaches:

wherein said step of classifying said images at said at least one computer is done manually, wherein an operator interfacing with said at least one computer and viewing a computer monitor (Column 11, ll. 8-11) manually inputs into said at least one computer a score (" 1" or "0", Column 11, Lines 14-15) to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

As per Claims 17, 18, and 22, these Claims recite substantially the same limitations as Claims 5, 6, and 10 above and analogous remarks apply.

As per Claims 30, 31, 34, 35, and 39, they recite substantially the same limitations as Claims 1, 2, 5, 6, and 10, above and analogous remarks apply.

6. Claims 3, 15, 32, 42 and 43 are rejected under 35 U. S. C. 103 (a) as being unpatentable over DeTitta and Carroll as applied to Claim 1, 13, and 30 above, and further in view of Hartley et al., (hereinafter Hartley), U.S. 5,544,254.

As per Claims 3, 15 and 32, DeTitta teaches that the computer presents the views to a user to classify; DeTitta does not specifically teach automatic classification. However, Hartley teaches:

wherein said at least one computer automatically classifies said plurality of microscopic crystals after receiving said images (Column 6, Lines 10-17, 36-43).

It would have been obvious to one of ordinary skill in the art to use the automatic classification system of Hartley in the combined system of DeTitta and

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Carroll to eliminate human intervention in order to cope with the high-throughput of the robotic setup. Use of the automatic classification feature would clearly increase system speed and efficiency once optimized and provides data that may be used to alter the operating parameters of the crystal production process (Hartley, Column 6, Lines 3740). One of ordinary skill in the art would be motivated to look to Hartley to see how others have classified crystals using image processing techniques.

With regards to Claims 42 and 43, arguments analogous to those presented for Claims 1 and 13 are applicable to Claims 42 and 43.

7. Claims 4, 16, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta and Carroll as applied to Claims 1, 13, and 30 above, and further in view of Reimer et al., (hereinafter Reimer), U.S. 6,061,086.

As per Claims 4, 16 and 33, DeTitta does not specifically teach the use of two cameras, However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view (Figure 3, element 20, Column 6, Lines 6163, wherein said second camera comprises a motorized zoom lens controllable (Figure 3, element 30, Column 6, Lines 63-66) by said at least one computer (Column 7, Lines 20-28).

It would have been obvious to one of ordinary skill in the art to eliminate the data volume while still maintaining the processing capability equivalent to the human visual system, which provides the greatest accuracy in classifying image objects as defective (Reimer, Column 3, Lines 3355).

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8. Claims 7, 19, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta and Carroll as applied to Claims 1, 13 and 30 above, and further in view of Harris et al., (hereinafter Harris), U.S. 6,388,788 B 1 and Automation Update (hereinafter Update), "Open for Inspection: Parker Daedal's New Positioner designed for Inspection Applications", Jan.

1998, www.textronics.com/Newsletters/archivedarticles/1998/0198newsletter.pdf

As per Claims 7, 19, and 36, DeTitta teaches:

wherein said indexing device comprises:

A. a first linear actuator for horizontally positioning said positioning station (Daedal X-Y Precision, Column 10, Lines 48-53), Update teaches that the X-Y Precision can accept microscopes and other machine vision inspection equipment. DeTitta, Carroll and Update do not specifically teach being able to move in a vertical axis, although DeTitta does teach that the plate glass and framework are controlled by a 4 axis indexing card. Four (4) axes to the examiner indicates movement in the X, Y, and Z axes. However Harris teaches:

B. a second linear actuator for horizontally positioning said at least one camera (cot. 15, ll. 3-5, although Harris teaches an XY controller moves the 96 well (microtiter) plate, it would have been obvious to one of ordinary skill in the art that the camera could be moved instead of the well plate), and

C. a third linear actuator for vertically positioning said at least one camera (cot. 14, Line 66).

It would have been obvious to one of ordinary skill in the art to use the suggestions of Update, which more thoroughly describes the custom capabilities

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of the Daedal X-Y Precision table disclosed in DeTitta and Carroll combination, and those features disclosed in Harris to incorporate obvious camera manipulation apparatus into the custom built table and indexing device disclosed in DeTitta and Carroll combination to provide the most cost effective by using commercial-of-the-shelf available parts and time efficient to keep up with the high throughput requirements of DeTitta (abstract) to build an indexing device. One of ordinary skill would be Motivated to use the above prior art systems particularly since Harris is directed towards imaging a 96 well plate as is DeTitta.

9. Claims 8, 20 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta, Carroll, Harris and Update as applied to Claims 7, 19, and 36 above, and further in view of Reimer et al., (hereinafter Reimer), U.S. 6,061,086.

As per Claims 8, 20 and 37, DeTitta, Carroll nor Update teach using two cameras. Harris teaches using two cameras (Column 16, Lines 53-56), but does not teach one camera having a constant zoom and the other having a motorized zoom. Although Harris does teach a motorized zoom (Column 14, Line 66).

However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view (Figure 3, element 20, Column 6, Lines 6263), wherein said second camera comprises a motorized zoom lens (Column 6, Line 63-.Column 7, Line 1) controllable by said at least one computer (Column 7, Lines 20-29).

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It would have been obvious to one of ordinary skill in the art to use the two camera feature of Reimer in the system of DeTitta, Update and Harris, to provide accuracy in finding the well locations by allowing the wide field of view camera image to be scanned to locate target (wells) images, particularly since both DeTitta and Harris are directed towards locating well positions and performing high speed classification.

10. Claims 9, 11, 12, 21, 23, 24, 38, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta and Carroll as applied to Claims 1, 13, and 30 above, and further in view of Inokuchi, U.S. 6,259,960 B1.

As per Claims 9, 21, and 38, DeTitta discloses that the user can name a plate manually, but does not specifically state that a barcode is used. Nor does DeTitta teach a plate sensing device. However, Inokuchi teaches:

comprising a bar-code reader (Column 7, Lines 36-40 and Column 18, Lines 39-41) and a micro-well plate sensing device (part moving means moves the part to be inspected into the target coordinate region, Column 7, Lines 60-65, or alternatively, the state coordinate system is adjusted based upon the imaged x-y difference between the target coordinates and the state coordinates, Column 8, ll. 23-39).

It would have been obvious to one of ordinary skill in the art to use Inokuchi's automated bar-code reader to input the information regarding the plate instead of manually inputting that data into the computer which may result in mistaken information. Also, Inokuchi teaches that it is well known to have position sensing capabilities in inspection devices, which facilitates automated inspection

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because precise placement of the target plate is not a true concern. One of ordinary skill in the art would have been motivated to look at the inspection device of Inokuchi because it is directed towards automatic image processing of microscopic images for certain features to be found in the image. Inokuchi also has a manual inspection mode as well as an automatic inspection mode.

As per Claims 11, 23, and 40, although DeTitta teaches that his inspection system is used on a computer, he does not specifically teach that is part of a network. Inokuchi is directed to a material-inspection and classification apparatus (Column 17, Lines 18-21, 24-26).

However, as per Claims 11, 23, and 40, Inokuchi teaches:

wherein said at least one computer is connected to a computer network.
(Figure 1, Column 16, ll. 60-65).

It would have been obvious to one of ordinary skill in the art to use the networking suggestion of Inokuchi in the inspection and classification system of DeTitta and Carroll to facilitate management of classification information at a central location thereby making it unnecessary to save and download classification data from individual plate imaging stations of DeTitta (Inokuchi, Column 17, Lines 43-50).

As per Claims 12, 24, and 41, Inokuchi teaches:

wherein said at least one computer network is the Ethernet. (Column 16, Line 65).

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11. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to Claims 13 above, and further in view of Bacus et al., (hereinafter Bacus), US 6226392 B1.

As per Claim 25, DeTitta does not specifically teach color images are obtained of the crystals. However, Bacus teaches:

wherein said images of said plurality of microscopic crystals are color images. (Column 8, Lines 56-58)

It would have been obvious to one of ordinary skill in the art to use the color filter wheel of Bacus with the imaging sensor of DeTitta to provide color images that will allow for more accurate classification of crystals when classification may be based upon the certain colors in the crystals. Furthermore, Bacus teaches that color images have been well known in inspection systems for a number of years.

As per Claim 26, Bacus teaches:

A) viewing each of said plurality of microscopic crystals through a first linear polarized filter (Figure 413, elements 172 or 170) and a second colored filter (Figure 413, element 180), wherein the color of said second colored filter is altered between red, green and blue (Column 8, Lines 57-58), to obtain a first image, a second image and a third image, and

B) combining said first image, said second image and said third image to obtain said true colored images (Column 8, Lines 59-62).

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12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta, Carroll and Bacus as applied to Claims 13 above, and further in view of Glazer et al (hereinafter Glazer), UK 2310925.

As per Claim 27, Bacus does not specifically teach using false colors.

However, Glazer teaches:

steps of viewing each of said plurality of microscopic crystals through a first linear polarized filter (Figure 1, element 15) and a second linear polarized filter (Figure 1, element 14) to obtain said false color images (p. 2, second paragraph).

It would have been obvious to one of ordinary skill in the art to use the false colors of Glazer in the color crystal images of DeTitta and Bacus to measure the refractive indices of a crystal which by using false colors allow for indications or measures across the sample for its optical anisotropy, which provides additional data to further classify any crystal material and take advantage of the image processing inspection system.

Contact Information

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mehrdad Dastouri
Primary Examiner
Group Art Unit 2623
July 21, 2004

MEHRDAD DASTOURI
PRIMARY EXAMINER

Mehrdad Dastouri